NEXTEL®

Nextel Communications, Inc.
2001 Edmund Halley Drive, Reston, VA 20191

April 8, 2002

Via Electronic Mail and Federal Express
Megan Hayes
The Alliance for Telecommunications Industry Solutions
1200 G Street, NW
Suite 500
Washington, D.C. 20005

Re: Nextel Communications, Inc. Fourth Quarter 2001 Report to the TTY Forum

Dear Ms. Hayes:

Pursuant to the Fourth Report and Order of the Federal Communications Commission ("Commission") in CC Docket No. 94-102,[3] Nextel Communications, Inc. ("Nextel") hereby submits this report on the status of its efforts to attain TTY accessibility on Nextel's iDEN handsets and network. Working closely with its vendor, Motorola, Inc. ("Motorola"), Nextel is pleased to report that its TTY accessibility progress continues to move ahead in a timely manner. Pursuant to this schedule, Nextel intends to fulfill the Commission's June 30, 2002 TTY deployment deadline.

Nextel is a provider of digital Commercial Mobile Radio Services using Motorola's iDEN technology. Nextel is one of only two such iDEN providers in the United States. Thus, Nextel has worked closely with Motorola in the research and development of a TTY compatibility solution for the iDEN product and network. Since the Telecommunications Industry Association ("TIA") approved the Lucent solution for providing TTY accessibility on digital networks, Motorola has invested significant time and resources in creating a solution that will provide the same accessibility on iDEN networks.[4]

As we reported in January of this year, Motorola and Nextel completed successfully lab testing of the TTY-capable iDEN handset and network infrastructure last year, and followed that testing with a successful First Office Application ("FOA") test of the TTY capabilities in Irvine, California in December 2001. The FOA, which resulted in no significant "bugs" or other problems with either the handset or network TTY functionalities, tested a broad range of TTY call scenarios. Nextel tested TTY mobile-to-mobile calls (using Nextel mobiles as the originating and terminating units), land-to-TTY mobile calls and TTY mobile-to-land calls. Additionaily, Nextel tested its numerous other features and functionalities, e.g., call waiting, call

[3] *In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Calling Systems,* Fourth Report and Order, CC Docket No. 94-102, FCC 00-436, released December 14, 2000 ("Fourth R&O").
[4] *See, e.g.,* Fourth R&O at para. 3.

forwarding, to ensure proper functioning with the TTY device. All of these test calls were successful. Finally, Nextel's FOA tested the Hearing Carry Over ("HCA") and Voice Carry Over ("VCO") capabilities of the iDEN TTY handset and network. These tests also yielded successful results.

Having deployed the TTY network infrastructure in Irvine, California for the FOA test in December, Nextel immediately began deploying the infrastructure components in its New York Market for a Second Office Application ("SOA") in January 2002. The SOA completed in January, at which time Nextel began full nationwide deployment of the TTY infrastructure in its network components. This deployment process will be completed in May. In the interim, however, Nextel plans to test a TTY call end-to-end with a Phase I capable Public Safety Answering Point ("PSAP"). Nextel plans to conduct this end-to-end test in April, working with a Phase I capable PSAP in a market where the TTY capability is fully deployed in Nextel's network. Additionally, this testing will include making TTY calls from a Nextel mobile unit to another carriers' mobile unit to verify successful inter-carrier operations.

Nextel is pleased to report that its efforts to timely deploy the TTY capability by June 30, 2002 continue on schedule. Additionally, all testing to date has produced successful results. Nextel appreciates the opportunity to provide this report to the TTY Forum as part of the forum's quarterly TTY report to the Commission. If you have any questions about this report, please do not hesitate to contact me at 703-433-8315.

Sincerely,

Robert D. Montgomery
Senior Manager – Regulatory Technology Development

NOKIA

FOR EXTERNAL USE

NOKIA Americas Standards
Submitted by:
Chris Wallace
V.P. Nokia Americas Standards

October 10, 2001

Nokia Status Report to TTY Forum #21 – March 2002

Nokia manufactures mobile phones for wireless technologies; AMPS, TDMA, CDMA and GSM; at both 800 and 1900MHz. Some phones are also developed with multiple technologies in an individual handset. Nokia also supplies network infrastructure for GSM carriers.

Nokia is currently developing FCC compliant TTY Compatibility in seven new phone programs with specific models having CDMA, TDMA, GSM and AMPS.

Nokia is committed to meet FCC deadlines for digital TTY according to industry standards set and agreed to.

HARDWARE SOLUTIONS:

Nokia continues to develop mobile handset products to support TTY/TDD Compatibility with TSB-121 three-pin headset functions. Other handset projects will have a built-in 2.5mm jack four-conductor "Stereo" connection in the handset body; with adapting interconnect cables to comply with TIA/EIA TSB-121.

As has been raised as an issue in the TTY Forum, Nokia remains concerned by the potential issues associated with inconsistencies introduced into the TTY environment from the use of after-market cables. Nokia also remains concerned about issues associated with the consistent implementation of TSB-121 by all parties in the TTY solution. Nokia has participated in the resolution of these concerns and is confident that the eventual outcome will be satisfactory.

MOBILE TERMINAL SOFTWARE SOLUTIONS:

CDMA

Nokia CDMA Products are developed by Nokia's San Diego facility

Six to eight models are under development for TTY Compatibility.

Participated in TTSI sponsored tests with mixed results.
Continuing to test with infra vendors with improved performance.
Nokia recently announced three models of phones with TTY capability
Cdma2000 1x 6370, which will be available in 2Q2002
Cdma2000 1x 6385, which will be available in 2H2002
Cdma2000 1x 3585, which will be available in 2H2002

NOKIA

FOR EXTERNAL USE

NOKIA Americas Standards

October 10, 2001

Submitted by:

Chris Wallace
V.P. Nokia Americas Standards

TDMA

Five to seven models are being developed for TTY Compatibility.
Nokia participated in both TTSI sponsored tests with good results.

Lab testing continues with the major Infrastructure with the excellent results.
Lab testing continues Carriers
First TDMA TTY compatible phone was announced in early November 2001 – Nokia 6360

GSM

Lab testing continues with the major Infrastructure with the excellent results.
Lab testing continues Carriers
Nokia recently announced 2 TTY compatible phones
GPRS 6590, which will be available in 2Q2002
GPRS 3590, which will be available in 3Q2002

Respectfully Submitted By:

Chris Wallace
V.P. Nokia Americas Standards

Douglas W. Neeley
Sr. Technical Standards Eng.
(202) 887-0145

Leo Fitzsimon
Government Affairs

Enclosed is information regarding Nortel Networks' plans to deliver TTY solutions to market in support of CDMA service providers ability to meet FCC TTY milestone objective.

- What is the status of TTY/TDD network infrastructure **software/hardware development and testing**?

  Nortel Networks response: Nortel Networks' development and product test is based on current standards: IS-127-2 (EVRC) & IS 733-1 (13K Vocoder). New revisions of these standards namely IS-127-3 (EVRC TTY) & IS-733-2 (13K TTY) have been published as of September 2001. Nortel Networks plans to support this new addendum to the standards in our next scheduled software release; MTX11/NBSS11 is scheduled to be GA Q4 2002. Operators will be able to deploy the Nortel Networks TTY solution based on the current standards IS-733-1, IS127-2 to meet the FCC deadline for implementation. Nortel Networks has completed internal testing using prototype and recently using commercial mobile handsets with TTY capabilities from only a few vendors, which have all shown positive results. Nortel Networks does not anticipate performance issues with any other vendor's handsets once they come available. Nortel Networks has also performed tests with a leading manufacturer of TTY/TTD PSAP equipment to ensure interoperability. Results of that specific testing were found to be positive.

- What is Nortel Networks TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the **FCC 4th Rule and Order 12-14-2000**?

  Nortel Networks response: Regarding Section 20-23, Turbocode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. Due to the code being proprietary Nortel Networks will not test or support these enhanced solutions. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features. The FCC does not require vendors to support TTY enhanced signaling.

- What are the **hardware baseline and software baseline** to support CDMA TTY/TDD functionality?

  Nortel Networks response:

Regulatory solution required	CDMA HW/SW baseline
TTY/TDD	MTX09 SW (DMS-MTX) NBSS10.1.2 SW (BSS) TTY capable handsets (3rd party)

- What **software baseline** must the MTX be running in order to upgrade to MTX10 and/or NBSS10.1.1?

  Nortel Networks response: The MTX is required to be running MTX09 in order to upgrade to MTX10 and/or NBSS10. Nortel Networks has always maintained an allowance for CSP or Communication Services Platform "jumps" from MTX release to MTX release. The MTX has received significant changes due to moving to a multi-processing architecture. It is because of the new CSP14 layer of the MTX10 release that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware **planned general availability dates** that support the deployment of this regulatory feature?

  Nortel Networks response: In order to allow Carriers to comply with the FCC's June 30, 2002 requirement for TTY/TDD implementation, Nortel Networks current plan for the enabling software full availability is:

Software load	CDMA SW general availability
MTX09	Now Available
NBSS10.1.2 with MTX09	January 25, 2002*
MTX10 CDMA – not req'd	December 07, 2001 –Now Available

  * To date all Nortel Networks customers who have scheduled a MTX10/NBSS10.1 upgrade have the ability to become fully compliant to the FCC TTY/TTD mandate prior to the June 30, 2002.

- How is the software/hardware for TTY/TTD **subscribers provisioned** in the network?

  Nortel Networks response: The provisioning for TTY must be done the same way as for the voice subscribers.

- What is the **schedule for deployment** of the software/hardware in the network?

  Nortel Networks response: The minimum baseline software requirements for this functionality are given above. For questions related to scheduling its deployment into a carrier's network, please contact Nortel Networks Product Deployment. All those CDMA customers who have ordered and scheduled for NBSS10.1.2 upgrade are currently showing plans for full network NBSS upgrade prior to June 30, 2002.
  Nortel Networks recommends that all customers who have not yet ordered and scheduled upgrade to NBSS10.1.2 contact Nortel Networks to ensure software upgrade prior to June 30, 2002.

- For TTY/TDD what are the plans to work with any wireless carrier to perform **end-to-end customer tests**, and when will this occur?

  Nortel Networks response: The verification process for NBSS 10.1 with the customer began in June 2001. Nortel Networks had recommended that operators engage their chosen CDMA TTY handset vendor during the verification process or VO process to participate in interoperability testing with the Nortel Networks solution. As of November 1st, 2001 TTY capable handsets had recently been acquired by all of our CDMA service provider VO partners. Due to the lateness of the terminals availability, Nortel Networks was unable to verify the interoperability of the TTY feature with the entire NBSS10.1.1 load in time for the planned GA date. Since that time Nortel Networks has created a "maintenance" NBSS load, NBSS 10.1.2, that will correct some minor performance issues, TTY fixes are also included. **The NBSS10.1.2 software release, which includes the TTY/TTD solution, has been fully verified within one or more of our lead customer's live networks.** The Nortel Networks TTY/TTD solution showed TCER of less than 1% in most cases and marginally exceeded 1% TCER is only the most strenuous RF and TTY/TTD test conditions. Nortel Networks used several different TTY mobile terminals during these test activities. Please note the 1% TCER is not part of the FCC mandate.

All verification activities were dependent upon the availability of commercial grade CDMA TTY/TTD handsets.

- What are Nortel Networks plans to test their own or other vendor handsets with your switch solution?

Nortel Networks response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Nortel Networks infrastructure software, namely NBSS10.1, was available in June 2001 for scheduled external end-to-end customer testing. This testing activity was scheduled to complete in advance of the Dec 31, 2001 FCC requirement. Our lead verification customers did not acquire commercial grade TTY handset until much later in the test window. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding handset availability.

Operators are encouraged to request their handset vendors to test their commercial grade CDMA TTY capable handsets in Nortel Networks Wireless Interoperability Test Lab.

Please contact Cher Bruce for scheduling TTY testing in the Nortel Networks Wireless Interoperability Test Lab, where testing is based on current published standards (Phone: 972-684-2299; Fax: 972-684-3881; csbruce@nortelnetworks.com)

- **Contacts:**

Product Marketing	MTX10/NBSS10.1 SW	Kurt Raaflaub	(972) 685-2971
Product Management	CDMA TTY/TDD	Maniam P	(972) 685-7203
Regulatory	E911Ph2&TTY/TDD	Charles Spann	(903) 852-6798
Product Deployment	CDMA NBSS SW	Mark Schwarzer	(972) 685-5851

Customer Response Template TTY/911 for GSM Systems
Date: 04-10-02 Version: TTYGSM002

Nortel Networks Solution Status- April 10th, 2002

Overview

Nortel Networks TTY Solution for GSM network consists of software for the BSS (applied on the Transcoding Unit (TCU)) and the Mobile Switching Center (MSC).

The TTY software for the BSS is currently being validated at a customer site and should be commercially available by the beginning of May 2002. This software has undergone extensive testing with different TTY terminals and devices in our R&D facilities in France.

The final release of the TTY Software for the MSC (to support circuit pooling) is being validated at a customer site and will be available at the same time as the BSS software release.

Nortel Networks customer support groups have put in comprehensive plans to enable a smooth and expeditious rollout of the TTY software across customer networks so as to meet the FCC deadline.

Summary of Inter-Operability Testing and Results

Nortel Networks has completed exhaustive inter-operability testing with several TTY terminals and device vendors.

- **Motorola (TTY devices used: Q90 Ameriphone, Compact Ultratech, Ezcom Pro Ultratech)**
- **Ericsson (TTY devices used: Q90 Ameriphone, Compact Ultratech)**
- **Nokia (TTY devices used: Q90 Ameriphone, Compact Ultratech)**

Nortel Networks is pleased to report that all the testing performed in our labs so far has demonstrated character error rates in compliance with the target 1% error rate or less and in most cases better than the target 1% error rate or less.

These results were obtained using the Gallaudet Tools suite as well as a multi-path fading simulator.

Please direct all queries to-

GSM Americas PLM	Vineet Nargolwala	(972)-685-7285
Regulatory	Charles Spann	(903)-852-6798

Enclosed is information regarding Nortel Networks' plans to deliver TTY solutions to market in support of TDMA service providers ability to meet FCC TTY milestone objective.

- What is the status of TTY/TDD network infrastructure **software/hardware development and testing**?

  Nortel response: Nortel Networks' TDMA TTY/TDD functionality is compliant to IS-823A (TTY/TDD Extension to TIA/EIA 136-410 Enhanced Full Rate Speech Codec) for the EFRC Codec. The development and internal product testing are now complete and end-to-end system verification is being performed. Nortel Networks has tested this feature with alpha/beta handsets from a few major vendors, which have all shown positive results. We have also received TTY capable mobile handsets containing commercial TTY software from major vendors, which have shown excellent interoperability test results. Nortel Networks has also performed tests with a leading manufacturer of TTY/TTD PSAP equipment to ensure interoperability. Results of that specific testing were found to be positive.

  Nortel Networks plans to support new and evolved standards in next year's software releases. Operators will be able to deploy the Nortel Networks TTY solution i.e. MTX10, which is based on the current IS-823A standard, to meet the FCC deadline for implementation.

- What is Nortel Network's TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the **FCC 4th Rule and Order 12-14-2000**?

  Nortel response: Regarding Section 20-23, Turbocode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. If TDMA standards are enhanced to support these devices, Nortel will support this in a future release. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features. The FCC does not require vendors to support TTY enhanced signaling.

- What are the **hardware baseline and software baseline** to support TDMA TTY/TDD functionality?

  Nortel response:

Regulatory solution required	TDMA HW/SW baseline
TTY/TDD	EDSPM SW for the ICP; MTX10 SW for the DMS-MTX TTY capable handsets (3rd party)

- What **software baseline** must the MTX be running in order to upgrade to MTX10?

  Nortel response: The MTX is required to be running MTX09 in order to upgrade to MTX10. Nortel Networks has always maintained an allowance for CSP or Communication Services Platform "jumps" from MTX release to MTX release. The MTX has received significant changes due to moving to a multi-processing architecture thus the CSP layer has evolved to CSP14. It is because of this very different CSP14 layer of the MTX10 release that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware **planned general availability dates** that support the deployment of this regulatory feature?

  Nortel response: In order that Carriers may comply with the FCC's June 30, 2002 requirement for TTY/TDD implementation, Nortel Networks has made TTY/TDD enabling software available as follows:

Software load	TDMA SW general availability
MTX10 TDMA (incl. DSPM)	December 07, 2001* - Now Available

  * In late January 2002 Nortel Networks made generally available as part of it's standard MTX10 TTY/TTD offering an improved TTY/TDD solution e.g. Auto baud capabilities, improved total character error rate (TCER). This new maintenance DSPM load was also made available to those customers who received the original MTX10/DSPM software prior to this new version's January release. To date all Nortel Networks customers who have scheduled a MTX10 upgrade have the ability to become fully compliant to the FCC TTY/TTD mandate prior to the June 30, 2002.

- For TTY/TDD what are the plans to work with any wireless carrier to perform **end-to-end customer tests**, and when will this occur?

  Nortel response: The verification process for MTX10 with the customer began in August 2001. Nortel had recommended that the operator engage their chosen TDMA TTY handset vendor during the verification process or VO process to participate in interoperability testing with the Nortel Networks solution. After much delay our service provider VO partners have acquired TTY capable handsets. **The TTY feature has now been fully verified within a lead customers live network.** The Nortel Networks TTY/TTD solution showed TCER of less than 1% in most cases and marginally exceeded 1% TCER is only the most strenuous RF and TTY/TTD test conditions. Nortel Networks used several different TTY mobile terminals during these test activities. Please note the 1% TCER is not part of the FCC mandate.

  Operators are encouraged to request their handset vendors to test their commercial-grade TDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.
  All verification activities were dependent upon the availability of commercial-grade TDMA TTY/TTD handsets.

- What is the **schedule for deployment** of the software/hardware in the network?

  Nortel response: The minimum baseline software requirements for this functionality are given above. For questions related to scheduling its deployment into a carrier's network, please contact Nortel Networks Product Deployment. The few TDMA customers who have ordered and scheduled an MTX10 upgrade are currently showing full network upgrade prior to June 30, 2002.
  Nortel Networks recommends that all customers who have not yet ordered and scheduled upgrade to MTX10 contact Nortel Networks to ensure software upgrade prior to June 30, 2002.

- What are Nortel Network's plans to **test their own or other vendor handsets** with your switch solution?

  Nortel response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Nortel Networks infrastructure software, namely MTX10, was available in August 2001 for scheduled external end-to-end customer testing. This testing activity was scheduled to complete in advance of Dec 31, 2001. Our lead verification customers did not acquire commercial grade TTY handset until much later in the test window. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding handset availability.

  Operators are encouraged to request their handset vendors to test their commercial grade TDMA TTY capable handsets in Nortel's Wireless Interoperability Test Lab. To date very few Nortel Networks customers have tested their choice of TTY/TTD enabled mobile handsets with the Nortel Networks solution.

  Please contact Gerry Chaparro for scheduling TTY testing in the Nortel Networks Wireless Interoperability Test Lab, where testing is based on current published standards (Phone: 972-684-4622; Fax: 972-684-3881; mailto:chaparro@nortelnetworks.com)

- **Contacts:**

Product Marketing	MTX10 SW	Kurt Raaflaub	(972) 685-2971
Product Management	TDMA TTY/TDD	Doug Kinnaird	(403) 769-8461
Regulatory	TTY/TDD	Charles Spann	(903) 852-6798
Product Deployment	MTX/NBSS SW	Mark Schwarzer	(972) 685-5851

Pine Belt Cellular, Inc.
3984 County Road 32
P. O. Box 279
Arlington, Alabama 36722

TTY Report – March 5, 2001

Pine Belt Cellular, Inc. is completely reliant upon its vendors to implement the TTY solutions in its handsets and network. Pine Belt does not have the ability to independently verify the release dates of the solutions that will be provided by the vendors.

1.) **Network infrastructure software development:**
Lucent Technologies, our switch and infrastructure manufacturer is aware of the TTY requirements. Our understanding is that Lucent is currently working on software solutions at this time. Pine Belt is dependent upon Lucent providing these solutions.

2) **Handset development and testing plans:**
Pine Belt Cellular uses handsets made by a number of manufacturers. The manufacturers most predominantly used by Pine Belt are Motorola, Nokia, and Kyrocera. Pine Belt will stay abreast of the developments by these manufacturers so when TTY solutions are made available, we will be able to provide these units to our customers as soon as possible.

3) **Beta testing and lab testing:**
Pine Belt Cellular will begin testing TTY compatible equipment as soon as both our handset and infrastructure manufacturers provide solutions to us.

4) **Release and general availability to carriers of network infrastructure software**
Pine Belt Cellular is awaiting updated reports of software availability from switching and infrastructure vendors.

5) **Availability to carriers of full acceptance test units:**
Pine Belt Cellular is awaiting software and hardware availability from switching, infrastructure, and handset vendors.

6) **Efforts toward achieving digital wireless solution compatibility with enhanced TTY devices:**
Pine Belt Cellular remains dependent upon the availability of vendor provided solutions to meet the FCC's tentatively mandated timeline (12-31-01) to provide E911 TTY access to our networks.

7) **Carrier coordination of testing with PSAP:**
This testing target date is dependent upon solutions provided by network infrastructure vendors and handset vendors.

8) **Carrier testing activities, including field testing, consumer end-to-end testing, and other necessary tests:**

Testing will begin immediately upon receipt of software and hardware. Pine Belt Cellular is dependent upon network infrastructure vendor solutions.

9) **Retail availability of necessary consumer equipment:**

Pine Belt Cellular is dependent upon the availability of handsets from vendors. No firm commitment has been received at this time from handset vendors.

10) **Geographic scope of network infrastructure deployment:**

Pine Belt Cellular service area: Alabama RSA3B2 & BTA415

TTY Forum #21 Carrier Status Report
April 10, 2002
Rural Cellular Corporation for itself and its affiliates (collectively "RCC")

1. Network Infrastructure Software Development

   TDMA Networks: RCC utilizes TDMA infrastructure from Lucent, Ericsson and Nortel. RCC is relying on these three infrastructure vendors to complete software development.

   GSM Network: RCC is currently evaluating options for TTY support over GSM.

2. Handset Development and Testing Plans

   RCC is relying on its handset vendors for the development and testing of TTY capable handsets. RCC is currently contacting its handset venders to determine the availability of handsets for testing. Once, RCC has handset available for testing and all software upgrades are completed, it will perform field tests in accordance with the Loeber and Walsh test plan submitted to the TTY Forum.

3. Beta Testing and Lab Testing

   Once TTY capable software is in place and handsets are available, RCC will begin field tests.

4. Release and General Availability to Carriers of Network Software

   RCC's infrastructure vendors have stated that the software releases to support TTY capability should be available by June 2002.

5. Availability to Carriers of Full Acceptance Test Units

   RCC is waiting for commitments from its handset vendors for the date that they will have full acceptance test units available.

6. Efforts Towards Achieving Digital Wireless Solution Compatibility with Enhanced TTY Devices

   RCC is working with its vendors and now with the TTY Forum to achieve a standard to support enhanced TTY devices.

7. Carrier Coordination of Testing with PSAP

RCC will conduct TTY testing with any PSAP that requests testing.

8. Carrier Testing Activities, Including Field Testing and Consumer End-To-End Testing

RCC will conduct consumer end-to-end testing after acceptable handsets and infrastructure software upgrades are in place and tested.

9. Retail Availability of Necessary Consumer Equipment

Retail availability is uncertain at this time.

10. Geographic Scope of Network Deployment

RCC is proceeding on a path that assumes it will be able to meet a June 30, 2002 deployment deadline.

Siemens
TTY Report
April 10th, 2002

Siemens is investing a significant amount of effort in order to comply with the FCC requirement to support E911 calls made from TTY devices on wireless digital networks.

Network Implementation

Siemens is supporting a BSS based TTY solution. This is a "Transcoder Pooling" solution now referred to as "CTM circuit pooling solution". This solution may be implemented as an external network element on the A- interface or integrated within the TRAU. The Siemens solution will not impact the existing vocoders already deployed and supported by Siemens.

Siemens received the first prototype unit (including the necessary hardware and software) and has completed the internal system testing at our lab in Boca Raton, Fl. Currently our TTY solution has been deployed to our customer lab for network and interoperability testing. This testing is scheduled to start in the second half of April 2002.

Handsets Implementation

Siemens Handset group will support TTY in 2002. Siemens will support TTY/CTM via an accessory cable and the handset will support the GSM bearer bit capability for signaling from the handset to the network.

Respectfully submitted,
Ilan Vardi
Siemens

Sony Ericsson Mobile Communications
TTY Forum #21 Report
April 09, 2002

This report details the verbal presentation provided by Sony Ericsson Mobile Communications at the March 05, 2002 TTY Forum 21. The attached report identifies development and testing status for handset products, release and general availability dates, efforts towards achieving compatibility with TTY devices, system testing, deployment activities, technical issues, and contact information.

Sony Ericsson has completed the development of TTY technology intended for integration within its products. These products are built to the approved relevant standards. The release of acceptance products to the carriers has been completed. In general, the technical feasibility to transport TTY across the digital wireless systems has been proven by the product operability testing. Sony Ericsson has prepared field test, interoperability test, and final product verification test groups with TTY test capability. Interoperability testing is being conducted within Sony Ericsson, and within the industry test events of TTSI within ATIS

Isolated technical flaws and system integration issues continue to be identified during tests of TTY products and systems. The isolation and resolution of these issues continues to require the development of new test techniques, test software and test systems. Tests have been developed to identify conformance to IS-840 MPS (Minimum Performance Specifications), minimum TTY bit duration test vectors, stop bit duration test vectors, PSTN signal quality capture fixtures, open source code Gallaudet test software, and recently released DSPG/HITEC TTY test software. These tools have made it possible to identify several failure mechanisms of PSAP and TTY units to TIA/EIA IS-825 Baudot modem TTY standard, V.18 international TTY signaling to PSAP devices, and test vector failures of PN1663 compliant PSAP equipment. Sony Ericsson has taken an active role in assisting in the refinement of TTY terminal technologies with Ultratec, Ameriphone, and DSPG.

While handset to infrastructure compatibility testing has taken place between several manufactures, test results continue to indicate interoperability issues. Improvements in TTY equipment via flash code updates, DSPG test software tools, and Industry participation in TTSI test events have lead to a huge improvement in TTY test results and system validation. Validation and test vector testing have shown remarkable performance of many digital wireless infrastructures to the limits of TTY standards. Many PSAP equipment devices have not demonstrated the ability to operate within the tolerances of published TTY standards. Resolution of the remaining issues will require the involvement and cooperation among the manufacturers, carriers, 911 PSAP facilities, standards organizations, and governing bodies. Sony Ericsson continues to actively develop and test existing and new TTY compatible products, participate and monitor the industry standards and test events, and work closely with the regulatory bodies and the ATIS Incubator. Sony Ericsson is closely monitoring the data generated by TTSI to determine compliance to the FCC mandated 1% TTY character error rate.

1. **Network Infrastructure Compatibility Evaluation :**

TDMA Status:

Sony Ericsson has tested the compatibilities of infrastructures, by testing handsets with Lucent, Nortel, Ericsson, and others infrastructures. The Sony Ericsson T61D TDMA handset appears to function with most infrastructure systems, with outstanding performance. Numbers of stationary test runs have been conducted with Ericsson and Lucent infrastructure with multiple TTY devices. TDMA handsets have been shown to perform regardless of typing speed, or the gap between the characters. Demonstrations of internal and external HCO/VCO solutions have demonstrated high quality audio transport. Several issues with carrier configurations, and system messaging have been observed. Calls to PSAP destinations have met with mixed testing results. Subsequent vector testing showed TDMA infrastructure performed well under different bit duration and stop bit duration tests, but that certain PSAP equipment failed to accept vectors designed to test tolerances defined within the TTY standards.

GSM Status:

Sony Ericsson has tested the development of infrastructures, by testing GSM handsets with Ericsson, Nortel, and Nokia and others infrastructures. The results have been outstanding in stationary and driving conditions. New products that incorporate higher impedance TSB-121 interfaces, and newly released HCO VCO products like the Ameriphone Q.90D have produced excellent results. Subsequent vector testing showed GSM infrastructure performed well under different bit duration and stop bit duration tests.

CDMA Status:

Sony Ericsson has tested the compatibility of infrastructures to validate CDMA handsets, with Ericsson, Lucent, and others infrastructures. The test influence of infrastructure on handset validation has been significant. Sony Ericsson has been unable to produce valid test results since February 2002 on Lucent infrastructure. While these performance issues are being addressed, Sony Ericsson has taken steps to put Ericsson CDMA infrastructure in place at RTP. Sony Ericsson has also pressed its component supplier to work more closely with CDMA infrastructure manufacturers, to validate chipset performance.

2. <u>Handset Development and Testing Plans;</u>

Sony Ericsson TTY terminal products have completed development. Test data has been generated for CDMA, TDMA, and GSM products. Handsets are available for manufacturer and carrier interoperability testing, and have been used at TTSI test events. T60C CDMA, and T61Z GSM handsets are commercially available.

TDMA Status

TTY development is complete. The handset performance received an excellent response. The handset is in the final release stage of development.

TDMA Plans

Carrier acceptance test units with the final user interface were released. Additional units for a field trial with Gallaudet were delivered in March.

GSM Status

GSM development is complete. Final infrastructure testing is nearly complete.

GSM Plans

T-Link adapters are available in the Special Needs Center (www.ericsson-snc.com). Additional product development plans are in process.

CDMA Status

There are performance issues with several test cases, which currently cannot be isolated until infrastructure is in place that performs to acceptable levels.

CDMA Plans

Product improvements and new product plans are in process

3. Availability to Carriers of Full Acceptance Test Units;

- *TDMA handset Model T61D released for carrier testing in February 2002*
- *GSM handset Model T61z customer shipped in March 2002*
- *CDMA handset T60C customer shipped in March 2002.*

4. Efforts Toward Achieving Digital Wireless Solution Compatibility with Enhanced TTY Devices.

Sony Ericsson continues to work very closely with all manufacturers and carriers on the TTY compatibility mandate. TTY manufacturers have recently released flash chip updates and new products, that isolate and resolve issues with the default setting for high speed and turbo modes, the TTY interrupt feature, auto power off, and other interfering features to digital wireless. Sony Ericsson has taken delivery of new TSB-121 cables from TTY manufacturers. Sony Ericsson has also evaluated new TSB-121 compliant TTY products.

5. Testing and Deployment Activities

Sony Ericsson is working with the operators/carriers in the test and deployment of network infrastructure systems. In addition Sony Ericsson is working with the ATIS Incubator (TTSI), which continues to hold test events.

6) Risks:

At the TTY Forum 21 Sony Ericsson reported that TTSI had accepted an action item to require forced mute in both the handset and the network. Subsequent testing continues to validate the performance improvements of this feature. Currently Sony Ericsson is working to identify PSAP and interoperability issues through the creation of specific test cases that identify the nature of remaining issues. These test vectors are showing dramatic results in isolating the root cause of interoperability issues. Significant PSAP issues continue to exist.

Please feel free to contact either Matt Kaltenbach or Steve Coston if you have any question regarding this report, or wish to contact test or product interfaces. Please contact your local customer interface for product sales and marketing information.

Southern LINC®

SOUTHERN COMPANY
Energy to Serve Your World™

Southern LINC® TTY Status Report
1st Quarter 2002

Southern LINC hereby submits its status report for 1st Quarter 2002 in accordance with the reporting requirement contained in the Federal Communications Commission's *Fourth Report and Order* in CC Docket No. 94-102. Southern LINC continues diligently to pursue compliance with the FCC's TTY requirements. Based upon the information it has received from Motorola, its sole vendor, Southern LINC is currently of the belief that its customers will be able to utilize the full TTY solution by June 30, 2002.

Development Activities: Southern LINC continues to communicate with Motorola regarding the development status of TTY capability for iDEN networks.

Testing and Deployment Activities: With regard to TTY-capable iDEN handsets, Motorola completed the necessary development and integration work, and Southern LINC began selling TTY-capable handsets to its customers in 2001. On the network side, Southern LINC has received the software upgrades required to provide TTY calling capability on an iDEN system and is in the final stages of installing those upgrades. It is Southern LINC's intention to test the complete iDEN TTY solution in the May 2002 timeframe. For testing purposes, Southern LINC plans to utilize the *Tools for Field Testing TTYs with Wireless Telephones*. The testing will incorporate various call scenarios to validate the performance of the iDEN TTY solution on Southern LINC's network. Southern LINC also plans to test the TTY solution by placing calls to a PSAP to ensure 911 calling capability, and it has made arrangements with a local PSAP for that purpose (Calhoun County, AL 9-1-1). It is Southern LINC's understanding, however, that industry field-testing under the auspices of the Alliance for Telecommunications Industry Solutions-sponsored TTY Technical Standards Implementation (TTSI) Incubator program has identified problems with the equipment used by some PSAPs that leads to an unacceptable character error rate for TTY calls. Southern LINC will continue to monitor this situation through the TTY Forum.

Geographic Scope of Network Infrastructure Deployment: Southern LINC is a regional carrier providing service in Georgia and Alabama and portions of Florida and Mississippi. Its deployment of the iDEN TTY solution will encompass its entire network.

For questions regarding this report, please contact:

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TTY Report to the FCC
On Behalf of Sprint PCS and its Network Managers
Prepared 4/10/02

1. ***Network Infrastructure Software Development***
   - Sprint PCS has received software from all of its network vendors. TTY infrastructure and handset interoperability testing is near completion.
   - The TTY feature is presently being activated in Sprint PCS markets with Lucent infrastructure. The Lucent TTY feature user trial, in cooperation with Gallaudet University in Washington D.C., was successful. Sprint PCS has begun implementation of TTY in all Lucent markets.
   - Nortel has one market activated at this time (the Kansas City metropolitan area). Testing results have been successful. A user trial was also successful. Sprint PCS has begun the implementation of TTY in all Nortel markets.
   - Samsung infrastructure testing at the Sprint PCS test laboratory has been completed. The physical removal and replacement of TCLA circuit cards in the Samsung Base Station Controller is necessary to support the TTY feature. The replacement of these cards has been completed. Field Integration Testing (FIT) has also taken place with good results. Finally, a user trial is underway and should be completed by 4/26. Upon successful completion of the user trial, the network rollout of this feature will continue as appropriate.
   - Motorola infrastructure testing at the Sprint PCS test laboratory is ongoing. Sprint PCS has encountered high character error rates (CER) with certain handsets. Sprint PCS continues to work with Motorola to isolate the source of the high CER, and Sprint PCS is due to receive another software "patch" on April 15. Due to these difficulties, Sprint PCS has modified its FIT and user trial dates. If Sprint PCS continues to experience unacceptably high CER with the new "patch", Sprint PCS may be forced to delay TTY launch in Motorola markets.
   - Sprint PCS and other wireless carriers have encountered difficulties when testing the TTY feature with PSAPs, which may interfere with the ubiquitous support of the TTY feature in our network. Sprint PCS along with other wireless carriers has brought this matter to the attention of the FCC. Sprint PCS intends to launch TTY despite the PSAP problems. Sprint PCS will educate its customers of the difficulties that may be encountered when dialing 911 and suggest alternate means of making emergency calls (via TRS, analog mode, or landline phone). Sprint PCS will continue to support industry efforts to find a long term solution to the PSAP issue.
2. ***Handset development and testing plans***
   - SPCS has successfully tested handsets provided by five vendors and expect our remaining vendors to deliver handsets in the first half of 2002.
   - Interoperability testing with all four infrastructure providers has been performed in a laboratory environment, and three of the four infrastructures have been tested in a field environment. Live network testing has been performed successfully in Washington D.C., Kansas City, and Lisle, IL. Laboratory testing will continue through the Sprint PCS nation wide launch and beyond.
   - Sprint PCS has encountered difficulties with our interoperability tests and have isolated some minor problems to specific handset models. Sprint PCS is receiving positive cooperation and support from handset vendors to fix the bugs quickly.
3. ***Beta testing and lab testing***
   - SPCS requires lab, field testing, and beta testing (in that order) prior to implementation. Our internal lab testing and field testing are extremely intensive and require approximately two to three months each.
   - Both lab and field testing are nearing completion.
   - SPCS has participated in the ATIS sponsored TTY Technical Standards Incubator (TTSI) program. Sprint PCS has also performed inter-technology testing with AMPS, TDMA, and CDMA wireless telephony systems yielding results consistent with other TTSI results.
   - SPCS has also completed a two live network user trial (beta test) with a deaf and hard of hearing user group, and is in the process of performing another over another infrastructure.
4. ***Release and general availability to carriers of network software***
   - All network infrastructure vendors have provided software solutions for TTY.

- Two network vendor's software have been conditionally released from Sprint PCS' lab. Lucent and Nortel infrastructure software has been authorized for the field with Samsung expected to follow very soon. Sprint PCS has, as noted above, encountered difficulties with Motorola infrastructure and has not, therefore, been released for implementation.

5. ***Availability to carriers of full acceptance test units***
   - See # 2
6. ***Efforts toward Achieving digital wireless solution compatibility with enhanced TTY devices.***
   - Sprint PCS is not pursuing a resolution of proprietary enhanced protocols as the FCC has temporarily relieved carriers of this responsibility. Sprint PCS will reevaluate enhanced protocols when industry standards supporting these protocols are in place.
7. ***Carrier Coordination of testing with PSAP***
   - While Sprint PCS has performed its own PSAP testing, it is relying mostly on ATIS' TTSI to coordinate more robust PSAP testing with the help of NENA and APCO.
8. ***Carrier testing activities, including field testing, consumer end-to-end testing***
   - Sprint PCS is testing with a variety of consumers (including Gallaudet University) in various markets prior to nation-wide deployment.
   - Sprint PCS is actively participating in the ATIS TTSI program and will continue to participate in additional "incubator" field tests in which carriers and vendors perform interoperability tests.
   - Sprint PCS was the first American domestic carrier to perform TTSI supported international interoperability testing with participants from another continent (Ericsson CDMA Lab testing in Sao Paulo, Brazil).
9. ***Retail availability of necessary consumer equipment***
   - Several TTY capable handsets are already available at Sprint PCS Stores now. Lists of available handsets and the methods of enabling the TTY feature will be available to the public when nationwide infrastructure support is complete.
10. ***Geographic scope of network deployment***
    - SPCS plans to launch nation-wide by June 30, 2002. If, however, Motorola infrastructure continues to show unacceptable performance, Sprint PCS may have to delay launch in its 13 Motorola markets.

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Arlington, VA 22201

Contact:
John Garner
Director, Regulatory Compliance
601-209-8201

Date: April 15, 2002

Purpose: TeleCorp PCS, Inc Quarterly TTY/TDD Report for all Lucent MSC served markets

TeleCorp PCS is fully compliant with all TTY requirements in all Lucent MSC served markets.

Date: April 15, 2002

Purpose: TeleCorp PCS, Inc Quarterly TTY/TDD Report for all Ericsson MSC served markets

Development Activities

1. network infrastructure software development;
   See Attachment 1: Sony Ericsson Mobile Communications and Ericsson Inc TTY Forum #20 Report
2. handset development and testing plans;
   See Attachment 1: Sony Ericsson Mobile Communications and Ericsson Inc TTY Forum #20 Report
3. beta testing and lab testing;
   See Attachment 1: Sony Ericsson Mobile Communications and Ericsson Inc TTY Forum #20 Report
4. release and general availability to carriers of network infrastructure software;
   Tritel Communications Inc. has purchased the necessary hardware and software and is in the process of installation and testing.
5. availability to carriers of full acceptance test units;
   See Attachment 1: Sony Ericsson Mobile Communications and Ericsson Inc TTY Forum #20 Report
6. efforts toward achieving digital wireless solution compatibility with enhanced TTY devices;
   See Attachment 1: Sony Ericsson Mobile Communications and Ericsson Inc TTY Forum #20 Report

Testing and Deployment Activities

7. carrier coordination of testing with PSAP;
   Tritel will utilize relationships developed during Phase I E911 implementation to arrange end to end testing.
8. carrier testing activities, including field testing, consumer end-to-end testing, and other necessary tests;
   Tritel will test TTY functionality as soon as all necessary network infrastructure is in place and will complete all testing prior to June 30, 2002.
9. retail availability of necessary consumer equipment;
   TeleCorp PCS, dba Tritel Communications Inc., has three models of TTY compatible handsets available for retail sale.

10. geographic scope of network infrastructure deployment;

Tritel is deploying the necessary network infrastructure in all markets as it becomes available from Ericsson.